

## REVIEW

# Factors influencing parental acceptance toward the use of passive immobilisation as behaviour guidance in children during dental treatment: a scoping review

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**Abstract**

Exploring parental opinions regarding the use of passive immobilisation during dental treatment is critical when identifying behaviour guidance application priorities. Instead of being dismissed as an inappropriate and less favourable option, this article aims to systematically evaluate factors affecting parental acceptance toward the use of passive immobilisation as behaviour guidance among children during dental treatment in various populations and regions. This research follows Arksey and O'Malley framework and updated by Joanna Briggs Institute Framework for Scoping Reviews methodology to summarise 40 research papers from 1984 to 2022 in PubMed, Web of Science, Science Direct, EBSCO Host, Scopus, grey literature and Google search outlining the research trend of parental acceptance toward passive immobilisation as behaviour guidance. Factors influencing parental acceptance toward the use of passive immobilisation were classified into parental socio-economic and demographic characteristics, exposure method of the devices to the parents, type of dental procedures, and children's cooperation and cognitive level. In conclusion, the current explorative review of the parental perspective toward passive immobilisation proposed a recommendation and facilitate the dentist to consider this technique as an alternative option for behaviour guidance in paediatric dentistry.

**Keywords**

Passive; Immobilisation; Restraint; Children; Special needs; Dental treatment

## 1. Introduction

The major challenges with paediatric dental care are mostly related to behaviour modulation. Dental care for children without their cooperation is difficult, if not impossible [1]. Behaviour guidance techniques (BGT) aimed at reducing dental anxiety, promoting a positive attitude toward the dentist, and ensuring an effective treatment outcome [2]. Implementing techniques outlined in basic BGT should form the foundation for all behaviour guidance provided by dentists. However, due to the diversity of children's attitudes and temperaments, the use of communicative behavioural guidance alone was insufficient as the techniques required bidirectional communication and active participation. This may sometimes not be tolerated by younger children and children with special health care needs who have limited psychological and emotional maturity [2, 3]. Integration of the overall BGT approach including advanced BGT should be considered and individualised for each child to facilitate the delivery of care [4]. The advanced BGT commonly employed and taught in advanced paediatric dental training programs include protective stabilisation, sedation, and general anaesthesia (GA) [5]. Protective stabilisation is

broadly defined as the restriction of a patient's movement, with or without the patient's permission to reduce the risk of injury while allowing the safe completion of treatment [6, 7]. If the restriction involves another person(s), it is considered active immobilisation while on the other hand, passive immobilisation techniques utilise the use of mechanical restraining devices (such as full-body immobilisation devices, positioning devices and mouth prop) [7].

The use of full-body passive immobilisation devices (e.g., Papoose Board® or Joey Board®) works on the proven splint principle of binding the child to a rigid board to suppress struggling [8]. However, the application of these mechanical restraining devices in paediatric dentistry provoked controversies and debate among practitioners and parents. The use of passive immobilisation devices was considered as cold and non-humanised conduct that resembled the use of straight jackets and evoked difficult ethical evaluation while making individual assessments by the general dentist [9, 10]. Acceptability is a multi-faceted construct that reflects the extent to which people delivering or receiving an intervention consider it to be appropriate based on anticipated or experienced cognitive and emotional responses to the intervention and has become

a key consideration in the assessment and implementation of healthcare interventions [11]. Given the limited exploration of passive immobilisation in paediatric dentistry, the assessment of parental acceptance is crucial when identifying priorities in behaviour guidance application.

No comprehensive review has been done to investigate parental approval of passive immobilisation since few perspectives exist regarding its indication, potential hazards, and acceptability of passive immobilisation as behaviour guidance among children during dental treatment globally [12–14]. This scoping review aimed to identify the parameters influencing parental acceptance of passive immobilisation as behaviour guidance among children during dental treatment in various populations and regions. The information offered in this article defines the scope of available research while also providing a roadmap for future research and policy to inform practice. Thus, this paper asks, “What factors influence parental hierarchy acceptance of passive immobilisation techniques as behavioural guidance in paediatric dentistry?”.

## 2. Materials and methods

A scoping review was conducted to synthesise evidence from a variety of study designs in order to clarify key concepts and identify gaps in the published literature, using the Arksey and O’Malley [15] and reported in accordance with the Joanna Briggs Institute Reviewers Manual [16]. Additionally, the literature screening process was summarised using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA-ScR) guidelines [17].

### 2.1 Search strategies

Table 1 illustrates how the review was structured using a PCC question (Population, Concept and Context) recommended for scoping reviews by the Joanna Briggs Institute. From 20 August 2022 to 05 September 2022, a literature search was conducted in PubMed, Web of Science, Science Direct, EBSCO Host Medline Complete and Scopus with the results evaluated based on their content and relevance. The phrases “parental acceptance” OR “parental attitude” AND “passive restraint” OR “passive immobilization” OR “passive stabilisation” OR “protective stabilisation” OR “papoose board” OR “behaviour guidance” OR “behaviour management approach” were searched in the databases. Table 2 summarises the search phrases that were utilised. Similar search phrases were also used to find any significant papers in the following journals: Paediatric Dentistry, European Archive of Paediatric Dentistry, Special Care in Dentistry, Journal of Indian Society Pedodontic and Preventive Dentistry, and Journal of Dentistry for Children. Because most of the articles published in these journals were relevant to this investigation, they were chosen. In addition, grey literature and Google searches were carried out.

### 2.2 Study identification and selection

Two independent reviewers assessed the significance and relevance of the selected literature based on its content and publica-

**TABLE 1. Search criteria based on a PCC question.**

Population	Parents of children and children with special health care need aged less than 18 years old
Concept	All types of assessment, ranking preferences, and acceptance of passive immobilisation as behaviour guidance technique in dentistry
Context	Different factors affecting the parental acceptance on passive immobilisation usage on their children

**TABLE 2. Summary of keyword term.**

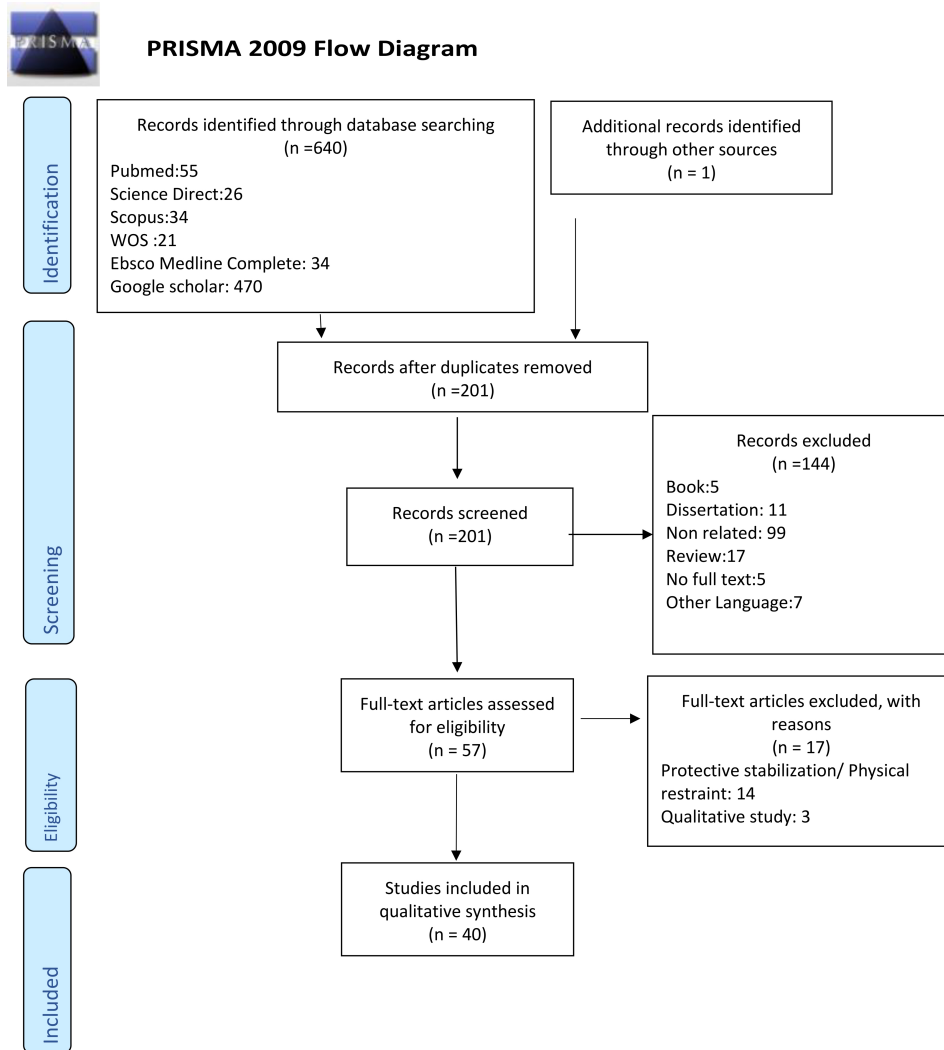
Keyword Term
Parental related term
Parental acceptance
Parental attitude
Imobilisation related term
Papoose board
Passive immobilisation
Passive restraint
Passive stabilisation
Protective stabilisation
Behaviour guidance
Behaviour management techniques

tion type (NSI and IWM). The publication type was then determined to ensure that only research articles published in English were included. Other sorts of articles, such as case studies, reviews, commentaries, editorial remarks, dissertations, and conference abstracts, were not considered. We omitted studies that did not utilise the term passive immobilisation explicitly, such as protective stabilisation or physical restraint, where the sort of restraining devices could not be determined.

After locating articles in the databases, they were imported into Thompson Reuters EndNote X6 software (Philadelphia, PA, USA), where duplicates were deleted. Based on the titles and abstracts of the papers, the eligibility criteria were utilised to do a preliminary screening. According to Fig. 1 for the PRISMA-ScR selection process flow diagram, the full text of publications was then examined to identify which articles were eligible for inclusion in the review. Disagreements among reviewers were rectified through discussions. A third reviewer (MYMP) was consulted when differences remained. A data extraction form was employed to extract study features such as the author(s), the year of publication, the country of origin of the study, the research design, the population, the concept, and the context. A narrative synthesis of the results was performed to address the objectives.

## 3. Results

The initial search using the keywords identified 641 articles. A total of 440 articles were excluded due to title, abstract, and duplicate removal screening. The remaining 201 articles were evaluated for eligibility on a case-by-case basis. Finally, only 40 full-text articles met the criteria for inclusion. The



**FIGURE 1. Flowchart on literature search and study selection process.** PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses; WOS: Web of Science.

articles included in the scoping review are summarised in **Supplementary Table 1**.

### 3.1 Characteristic of the included studies

The publications featured in this study spanned between the years 1984 to 2022. Only two studies were published in 1984 [18, 19]. After a quinquennial period of silence, three studies from the United States begin to publish their findings on parental attitudes on behaviour management in paediatric dentistry in 1991 [20–22]. Following a study in 1992 [23], two studies in 1995 [24, 25], a study in 1998 [26] and 1999 [27] were published. In the millennial years, two publications were published in 2005 [12, 28], and one research was published in each of 2007 [29], 2008 [30] and 2010 [31]. Then, in 2012, authors from Asian countries began to contribute two researches [32, 33]. Around 25 of the 40 publications were published in the previous ten years, demonstrating an increase in interest in the use of passive immobilisation in dentistry settings.

As illustrated in Fig. 2, a total of 40 papers were reviewed, which slightly more than one-third (15 of 40) conducted in the United States. India was second with eight articles, fol-

lowed by Iran and Saudi Arabia with three articles. Brazil, Germany, Israel and Malaysia, each with two articles. Greece, Japan, Spain, Thailand and Turkey each contributed one paper. Among all the papers reviewed, only five articles utilised sample parents with special healthcare needs originated from India [32], United States [25, 30], and Brazil [29, 34]. Three studies were comparing parents with disabilities and without disabilities [25, 32, 34]. The type of disabling condition includes physical disabilities such as cerebral palsy [29], and syndromic children with intellectual disabilities such as Down's syndrome [25, 34], Autism Spectrum Disorder [30], and Intellectual Developmental Disability [29].

### 3.2 Type of passive immobilisation

Most of the studies (95%) included used full body restraining devices like Papoose Board and Pedi-Wraps to denote passive immobilisation technique. Three articles specified mouth prop devices as passive immobilisation instrument in their studies [32, 35, 36].

## Countries of Primary Studies' Subjects

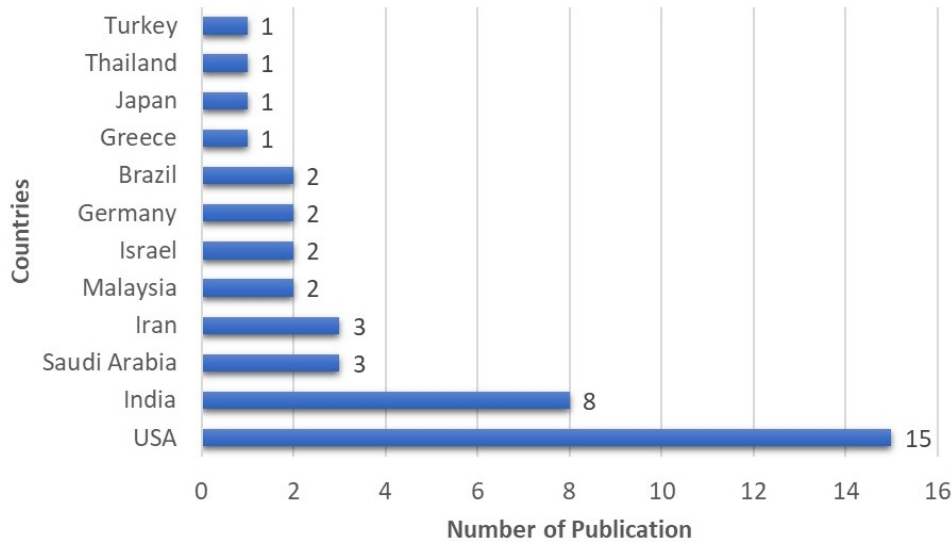


FIGURE 2. Countries of primary studies' subjects.

### 3.3 Factors influencing parental acceptance of passive immobilisation techniques

Factors influencing parental acceptance toward the use of passive immobilisation devices as behaviour guidance in children during dental treatment could be divided into three major categories which were parent influences, children characteristic, and type of dental procedures. The parental influences were subdivided into cultural, socio-economic, educational (socio-behavioural), and method of exposure while the children's characteristics were age, cognitive level, and children with special health care needs.

#### 3.3.1 Parent influence

##### 3.3.1.1 The impact of cultural factors

Cultural factors such as race and ethnicity have been found to influence patient behaviour and child-rearing practices, which in turn can influence a child's willingness to cope in a dental setting [37]. Culture helps to construct parenting identity and is transmitted by influencing parental cognitions that in turn were thought to shape parenting style and their willingness to accept different treatment modalities [38]. This scoping review found four articles mentioning different parental racial backgrounds in relation to parental acceptance toward passive immobilisation [13, 26, 39, 40] while only one article discussed parental anxiety factor [41].

Passive immobilisation technique was more acceptable for authoritarian parents while authoritative parents tended to accept communicative management techniques [41]. When compared to authoritarian and permissive parenting, authoritative parenting has the most positive impact on children with better emotional development and more cooperation in dental offices [42]. Parental preferences for BGT also may be related to parental dental anxiety as children of moderate to high-anxiety parents showed more negative behaviours [43]. As a result of this, parents with moderate anxiety seem to prefer protective stabilisation if needed [41].

Hispanic parents were more accepting of passive immobilisation techniques for their child's dental treatment as compared to African American and non-Hispanic American parents [13, 40]. Hispanic mothers were reported to have a greater level of discipline in parenting [44] while white non-Hispanic parents reported less authoritarian parenting styles than Mexican American parents [45]. On the contrary, Hispanic parents from a study by Scott and Garcia-Godoy [26] showed that no single behaviour management technique was rated completely acceptable due to the smaller sample size.

Al Zoubi *et al.* [39] suggested that cultural and socio-economic differences gave different outcomes between the two samples from Germany and Jordan. Sample parents from Jordan preferred passive immobilisation over pharmacological techniques in contrast with parents from Germany who favoured general anaesthesia (GA) among other advanced BGT. This situation was attributed by higher caries prevalence in the primary dentition of 6 year-old of Jordanian children (76.4%) [46] as compared to children in Greifswald (58.5%) [47] which due to the high cost of pharmacological treatment and non-coverage of this treatment by insurance in Jordan may be a factor which influences the parent's acceptance of passive immobilisation [14]. On the other hand, GA for dental treatment was generally covered by the health insurance till the age of 12 years in Germany [39].

##### 3.3.1.2 The impact of socioeconomic and education background

Another factor influencing parental acceptance of passive immobilisation is the family's socioeconomic status. According to studies, parents with a moderate to high socioeconomic class favoured this strategy less [18, 23, 31]. There was a statistically significant difference in family income between parents from the University clinic and the private practice since one of the main reasons for families visiting the University clinic was the lower cost [48].

The parent's employment and educational background



are crucial factors in selecting the ideal BGT for their children's treatment. Professionals and semi-professionals with a higher level of education were less receptive to passive immobilisation techniques and more accepting of pharmacological behaviour approaches like GA and nitrous oxide sedation [32, 39, 48, 49]. They are thought to comprehend the procedure better and demand the most pleasant therapy method. Surprisingly, despite their professional, semi-professional, skilled, and semi-skilled employment background, passive immobilisation was identified as the second most accepted BGT among parents in an Indian survey [50]. On the flip side, Seangpadsa *et al.* [51] also obtained similar results with passive restraints ranked at the second highest approval rating in their study although the majority of the parent had bachelor's degree (62.5%) and higher than bachelor's degree (22%). Sometimes, regardless of their educational status, parents still opted for passive restraint as a behaviour management modality, rather than sedation and GA particularly in uncooperative children [52].

### 3.3.1.3 Method of exposure to passive immobilisation

The parent was exposed to passive immobilisation techniques in a variety of ways, including audio-visual, PowerPoint presentation, verbal explanation, written description, photograph, or real-time observation of the devices being used on their own child. According to studies, parents who watched videotapes with explanations were substantially more receptive to behaviour management techniques than those who watched videotapes without explanations [29, 35]. Parents who received a good explanation for the papoose board were more likely to accept it than parents who received a neutral, non-committal explanation [26]. Also, the demonstration video of Papoose Board usage in a positive and stress-free environment increased acceptance among responders [53].

A written and visual description of the passive immobilisation technique alters carer attitudes toward the procedure and increases their likelihood of consenting to its use [50, 54]. Nonetheless, it was advised that providing information about each procedure to parents in an interpersonal (verbal) manner is most likely to result in parents who feel fully informed and are more likely to offer written consent [37, 55]. On the contrary, Paryab *et al.* [56] discovered that none of the information presentation strategies showed a preference over the others in behaviour management.

Randomisation order of the vignette in the videotape may uniquely influenced the way in which a respondent reacts as the parents watching passive immobilization first were not influenced by other management techniques and, therefore, may not have rated it as unacceptable as parents who watched passive immobilisation last [57]. Group effect on parental rating also tends to rate passive immobilisation as less acceptable than parents viewing the same BGT individually but the effect was not significant [20].

After experiencing passive immobilisation with their children, most parents' attitudes improved [22, 27, 30]. The actual presentation of the use of the papoose board was done in accordance with currently acceptable procedures. This method gave them a positive impression that their decision to allow

passive restraint was appropriate and that they would be willing to have their child treated under passive restraint in the future if necessary [22, 27].

## 3.3.2 Children characteristic

### 3.3.2.1 Age and cognitive level of the child

Acceptance of passive immobilisation is higher in parent with younger age group children due to the child uncooperativeness [51, 53]. Children's behaviour depends on the level of development and age which might affect their coping mechanism with difficult or anxiety-inducing situations such as dental treatment [54]. Passive immobilisation was viewed as a safe, protective, and effective technique by the parent with preschool children [51]. However, the majority of parents with pre-school age children preferred least aggressive techniques instead of passive immobilisation [51, 58]. As the child enters the school, the child initiates the process of socialising and learning the conforming boundaries of behaviour which might improve their coping mechanism [59]. This might be the reason why most parents (84.5%) responded they would prefer to stop the treatment of an uncooperative child, or to stop and calm the child and then resume treatment using communicative BGT in middle age school children [60].

### 3.3.2.2 Children with special health care needs

Children with special health care needs (CSHCN) is defined as "those who have or are at increased risk for a chronic physical, developmental, behavioural or emotional condition and who also require health and related services of a type or amount beyond that required by children generally" [61]. They exhibited stronger anxiety due to their cognitive impairment which caused communication barriers between patients and dental professionals, leading to more challenges in behaviour management [62]. Parents of CSHCN exhibited more willingness to use techniques to accomplish needed care, based on their experienced working with other providers or therapists or their own approaches to function in daily life with a CSHCN [25, 34]. A parent whose child had experienced with passive restraint was 1.8 times more likely to accept passive physical restraint than a parent whose child had no such prior experienced [29]. Dentists also reported that 20% of children with autism of the studied population showed calming effect while utilising the stabilisation devices which might increase parent acceptability [30].

### 3.3.2.3 Type of dental procedure

In 1984, a study showed that Papoose Board was consistently unacceptable with all dental procedures such as dental examination, prophylaxis treatment and restoration but was greatly accepted only during an emergency extraction [19]. Still in 2021, higher parental acceptance of passive immobilisation was noted simply when the treatment was urgent (*e.g.*, pain or dental trauma) [39].

Al Zoubi *et al.* [63] pointed out that the use of passive restraint should be limited to specific emergency situations for a short duration of time and the dentist should clarify the technique to the parents before using it. A retrospective cohort of 4300 parents, passive restraint was opted for an alternative BGT when sedative techniques fail to overcome

resistive behaviour in order to complete the treatment [64].

### 3.4 Passive immobilisation ranking parental preferences

Exploration of 40 articles showed that the relative acceptability of passive immobilisation techniques has not shown much change over time and has lingered in the last and second last of ranking preferences from other BGT. However, ranking preferences among parents with disabilities increased to the second most preferred techniques [25, 29, 32, 34] even in comparison with GA which might be attributed due to potential systemic risk of anaesthetic agent particularly in children with medically compromised [34, 65]. It could be seen that the high acceptance level of protective stabilisation strategy was attributed to the fact that parents were more familiar with the use of restraining devices in medical and dental care, including the trust established between parents and professionals who work in the department as many patients have been monitored over long periods of time [34].

## 4. Discussion

### 4.1 Strength of the study

To our knowledge, this is the first comprehensive scoping review that explores various factors influencing parental acceptance toward the use of passive immobilisation as behaviour guidance in children during dental treatment. Existing review articles have not discussed arguments regarding passive immobilisation relevancy instead as being considered as forgotten behaviour management technique. On the other hand, this scoping review was able to screen all publicly accessible resources worldwide. Although a systematic review cannot be conducted at the moment due to the scarcity of experimental studies in the context of outcome measures of parental acceptance toward passive immobilisation, this review followed a structured methodology that included the ranking preferences of BGT among parents and their confounding factors that influence parental mannerism. Thus, this article may be the most in-depth discussion regarding passive immobilisation techniques in dentistry.

### 4.2 Knowledge gap

The hierarchy of acceptability of the passive immobilisation has changed in some regards for the past several decades. Several studies of parental acceptance of this advanced BGT demonstrated differing views of parental attitudes. Earliest studies conducted in 1984 regarding papoose board stated that the parent unfavoured aggressive techniques and they believed that the use of passive immobilisation device was unacceptable in all dental procedures except for emergency exodontia [18, 19]. Approximately a decade after, papoose board still located at the lowest rank of parental acceptance regardless to group effect on the parental rating and randomised order of the videotapes used to introduce the BGT [20, 21]. Nevertheless, real time observation of the passive immobilisation device being applied to their own child showed that 90% of the mother approved the use of papoose board [22]. As the time evolved,

higher acceptance rate was found with regard to positive verbal explanations by the dentist [28] and children with different disabilities [25, 29, 32, 34]. Tsuchihashi *et al.* [33] who monitored internal stress using electrocardiogram (ECG) in healthy children showed that passive immobilisation technique would not necessarily be a traumatic event in a short term. Papoose Board also known as sensory adaptation technique device that provide a calming effect in CSHCN and children with autism [30, 66]. In 2022, a study done in CSHCN showed that papoose board can be considered safe and has no discernible influence on the child's physiological responses by the measurement of their blood pressure, heart rate, and oxygen saturation level [67]. There were limited studies that compared the acceptability of passive restraint among parents with healthy children versus CSHCN as the strategy was viewed as "aversive" technique and restricted by litigations and policies by certain countries. Passive immobilisation may not be equally accepted and vary widely in different parts of the world and the acceptance may be uniquely influenced by either race and ethnicity [40], cultural background [13, 39, 51], parenting style and parental anxiety [41].

Passive immobilisation is a contentious issue for dental practitioners. The professionals and lay media have described the use of papoose board as a "barbaric practice" that should be banned and may be seen as child abuse [9, 68]. The use of passive immobilisation devices was considered as a cold and non-humanised conduct that resembling the use of straightjackets by the psychologist [9]. This was consistent with research from other health services as well, where passive immobilisation is perceived as emotionally challenging among nurses [69]. Exploration of general dentist perspectives showed that the use of restraint evoked difficult ethical evaluations while making individual assessments [10]. In United Kingdoms and Nordic countries, protective stabilisation were no longer a legal method of care [70]. However, in Asian countries like Malaysia, there was no legislation on the use of passive immobilisation devices in dental settings. The only legislation on the use of passive immobilisation was in non-psychiatric settings, where it should only be considered in emergency situations or if deemed clinically appropriate and justified [71]. The principles of human right to health must be adhered to at all times and should not be used as a form of punishment [72].

The current review's factors resulted in a suggestive preference checklist before implementing passive immobilisation as a behaviour guidance technique in paediatric dentistry (Table 3). This will assist the practitioner in considering and justifying passive immobilisation techniques as a viable choice for behaviour management in dentistry settings. Every time a passive immobilisation device is used, it is strongly advised that details such as indications, written consent, vital signs monitoring records (*e.g.*, baseline, pre-operative, intra-operative and post-operative), length of use, and side effects be recorded.

## 5. Conclusions

The provision of information allows parents to engage in treatment decision-making, which gives an understanding of aspects related to their child's recommended dental care and

**TABLE 3. Suggestive preference checklist toward passive immobilisation as behaviour guidance techniques.**

Factors	Assessment of Suggestive Preference toward passive immobilisation	
	Low	High
<b>Parent Factor</b>		
Parenting style	Authoritative	Authoritarian
Parental dental anxiety	High dental anxiety	Low dental anxiety
Socio-economy status	Afford/insurance covered for General Anaesthesia modality cost	Less affordable/no insurance covered for General Anaesthesia modality cost
<b>Children Characteristic</b>		
Age	School children	Younger child (Pre-schooled children)
Cognitive level	Healthy children	Special Health Care Needs Children
Medical Status	Severe respiratory diseases affected by restriction of the chest	Medically compromised that contraindicated for GA
<b>Dental Procedure</b>		
The urgency of the treatment	Not urgent	Urgent
Duration of the treatment	More than 30 min	Less than 30 min

aids in reducing situational parental anxiety. Providing information on BGT to parents before the start of treatment is an essential component of children's dental care, as positive verbal information enhances parents' acceptance of the indicated particular type of dental treatment.

#### ABBREVIATIONS

AR, active restraint; BGT, behaviour guidance techniques; BMT, behaviour management techniques; CE, Contingent Escape; DIS, Distraction; GA, general anaesthesia; HOM, hand over mouth; MOD, modelling; MP, mouthprop; N<sub>2</sub>O<sub>2</sub>/O<sub>2</sub>, nitrous oxide/oxygen Sedation; PB, papoose board; PI, passive immobilisation; OS, oral sedation; VC, voice control; PR, positive reinforcement; TSD, tell show do.

#### AVAILABILITY OF DATA AND MATERIALS

The data are contained within this article (and supplementary material).

#### AUTHOR CONTRIBUTIONS

NI—devised the methods, collected and analysed the data and led the writing. MYPMY—commented on methods, assisted in data analysis and guided the writing. IWM—conceived the idea for the whole study, supervised NSI during data collection, guided the writing, and commented on the draft. All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript.

#### ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The ethics were approved by the University Teknologi MARA (UiTM) Research Ethics Committee with the reference number (REC/08/2020/FB 189) and consent to participate is not

applicable.

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#### CONFLICT OF INTEREST

The authors declare no potential conflicts of interest with respect to the authorship and/or publication of this article.

#### SUPPLEMENTARY MATERIAL

Supplementary material associated with this article can be found, in the online version, at <https://oss.jocpd.com/files/article/1785195158592995328/attachment/Supplementary%20material.docx>.

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